

BORON DEFICIENCY IN CHRYSANTHEMUMS

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Chrysanthemums (*Chrysanthemum X morifolium* Ramat.) are widely cultivated year-round outdoors and under greenhouse conditions for garden plants, cut flowers, and potted plants (5). It is the most popular flower in the United States surpassing both roses and carnation in total wholesale value (5). The species does not exist as a native plant, but presumably developed through man's efforts in plant breeding.

Numerous nutritional disorders have been reported in chrysanthemum. Of these, one which has been found in Florida is boron deficiency. Florida soils are generally low in boron (2).

SYMPTOMS. Internodes are shortened resulting in restricted growth of the plants. Leaves are leathery or brittle with red or purple discoloration and may show epidermal cracks and corky veins. Flowers are small, discolored, and exhibit quilling (1,3).

TREATMENT. For low boron soils, 10 pounds per acre (1/3 ounce per 100 square feet) of borax may be added prior to planting, or boron may be applied in the fertilizer. If a deficiency develops, 2 to 3 spray applications containing 1.5 pounds of borax per 100 gallons of water at weekly intervals may be used (3). Boron toxicity may result if the equivalent of 10 pounds of borax per acre is exceeded. Acid soils render boron soluble and available to the plant, whereas alkaline soils will render it insoluble and unavailable (4).



Fig. 1. Chrysanthemum flower showing petal quilling and discoloration typical of boron deficiency. DPI photo by Jeff Lotz.

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SURVEY AND DETECTION. Look for thick, brittle leaves with epidermal cracks, corky veins, and reddish discoloration. Flowers are small, petals exhibit quilling, and turn brown or black in color, particularly at the center (Fig. 1).

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